WHAT IS CLAIMED IS:

1. A method for directing a population of cells to differentiate along a mesodermal cell lineage, said method comprising culturing said cells in the presence of bone morphogenetic protein 4 (BMP4) or a homologue, analogue or functional equivalent thereof for a time and under conditions sufficient for said cells to preferentially differentiate into mesodermal cells or cells of a mesodermal lineage.

2. The method of claim 1, wherein said cells are EPL cells.

3. The method of claim 1, wherein said cells are stem cells.

4. The method of claim 3, wherein said stem cells are selected from the group consisting of embryonic stem cells, somatic stem cells, germ stem cells, epidermal stem cells, adult neural stem cells, keratinocyte stem cells, melanocyte stem cells, adult renal stem cells, embryonic renal epithelial stem cells, embryonic endodermal stem cells, hepatocyte stem cells, mammary epithelial stem cells, bane marrow-derived stem cells, skeletal muscle stem cells, bone marrow mesenchymal stem cells, $CD34^+$ haematopoietic stem cells and mesenchymal stem cells.

5. The method of claim 1, wherein said BMP4 is derived from a homologous species to said cells.

6. The method of claim 1, wherein said BMP4 is derived from a heterologous species to said cells.

7. The method of claims 1, wherein said cells are isolated from an animal selected form the group consisting of primates, livestock animals, laboratory test animals, companion animals and avian species.

8. The method of claim 7, wherein said cells are isolated from a mammal.

9. The method of claim 8, wherein said cells are isolated from a human.

10. A method for generating mesodermal cells from ES or EPL cells said method comprising:

(a) culturing ES cells or EPL cells in MEDII or its functional equivalent in order to generate embryoid bodies (EBM);

(b) maintaining said EBMs in culture for a time sufficient to allow aggregation of said EBMs;

(c) transferring said aggregated EBMs to gelatin-treated wells;

(d) allowing said aggregated EBMs to adhere to said gelatin-treated wells; and

(e) culturing said adhered EBMs in serum free medium comprising BMP4 for a time sufficient to allow said EBMs to generate mesodermal cells, and thereby generating mesodermal cells from ES cells or EPL cells.

11. The method of claim 10, wherein said BMP4 is derived from a species homologous to said cells.

12. The method of claim 10, wherein said BMP4 is derived from a species heterologous to said cells.

13. The method of claims 10, wherein said cells are isolated from an animal selected form the group consisting of primates, livestock animals, laboratory test animals, companion animals and avian species.

14. The method of claim 13, wherein said cells are isolated from a mammal.

15. The method of claim 14, wherein said cells are isolated from a human.

16. Mesodermal cells prepared by the process of culturing stem cells, or EPL cells or their committed progenitor cells in the presence of BMP4 for a time and under conditions sufficient for mesodermal cells to appear.

17. A method for screening for a change in a developmental stage of an EPL or other stem cell or mesodermal cell, said method comprising:

exposing an *in vitro* or *ex vivo* culture or suspension of EPL or other stem cell or mesodermal cells to an agent having a potential to induce proliferation and/or differentiation and/or self-renewal, wherein the level of proliferation and/or differentiation and/or self-renewal is determinable by a surface marker on said cells,

contacting said cell surface with a ligand for said surface marker, and

detecting the presence of binding to said surface marker, wherein the pattern of surface markers determines whether an agent has induced proliferation and/or differentiation of said EPL or other stem cell.

18. The method of claim 17, wherein said surface marker is specific for a mesodermal cell.

19. The method of claim 18, wherein said marker is *brancyury*.

20. The method of claim 17, wherein the stem cell is selected from the group consisting of: embryonic stem cells, somatic stem cells, germ stem cells, epidermal stem cells, adult neural stem cells, keratinocyte stem cells, melanocyte stem cells, adult renal stem cells, embryonic renal epithelial stem cells, embryonic endodermal stem cells, hepatocyte stem cells, mammary epithelial stem cells, bane marrow-derived stem cells, skeletal muscle stem cells, bone marrow mesenchymal stem cells, $CD34^+$ haematopoietic stem cells and mesenchymal stem cells.

21. A method for determining a developmental stage of an EPL or other stem cell or mesodermal cell or cell developmentally in-between after exposure to a potential proliferating- or differentiating- or self-renewal- stimulating agent, said method comprising:

capturing said EPL or other stem cell or mesodermal cell or cell developmentally in-between by immobilization to an anchored antibody to a solid support, and

screening said immobilized cell with a range of antibodies labeled with separate reporter molecules or a range of anti-immunoglobulin antibodies each labeled with a reporter molecule used to determine existence of particular antigens said antigens being indicative of the developmental stage of the cell.

22. The method of claim 21, wherein said surface marker is specific for a mesodermal cell.

23. The method of claim 22, wherein said marker is *brancyury*.

24. The method of claim 21, wherein the stem cell is selected from the group consisting of: embryonic stem cells, somatic stem cells, germ stem cells, epidermal stem cells, adult neural stem cells, keratinocyte stem cells, melanocyte stem cells, adult renal stem cells, embryonic renal epithelial stem cells, embryonic endodermal stem cells, hepatocyte stem cells, mammary epithelial stem cells, bane marrow-derived stem cells, skeletal muscle stem cells, bone marrow mesenchymal stem cells, $CD34^+$ haematopoietic stem cells and mesenchymal stem cells.

25. A method for tissue repair, regeneration and/or augmentation, said method comprising:

generating mesodermal cells by culturing EPL cells or stem cells in the presence of an effective amount of BMP4 or a functional equivalent thereof for a time and under conditions sufficient to generate mesodermal cells, and

introducing the mesodermal cells into a subject requiring tissue repair, regeneration and/or augmentation.

26. The method of Claim 25, firther comprising proliferating and/or further differentiating the mesodermal cells.

27. The method of claim 25, wherein said tissue is selected from the group consisting of cells of haemopoietic lineage, cells of muscle lineage, bone, connective tissue, organ tissue and cells of the immune system.

28. The method of claim 25, wherein said organ tissue is selected from heart, liver, pancreas, kidney, brain, epidermis, skin, breast, lung, head, thymus, eye, epithelium, gut, biliary system and spleen.

29. The method of claim 25, wherein the stem cell is selected from the group consisting of: embryonic stem cells, somatic stem cells, germ stem cells, epidermal stem cells, adult neural stem cells, keratinocyte stem cells, melanocyte stem cells, adult renal stem cells, embryonic renal epithelial stem cells, embryonic endodermal stem cells, hepatocyte stem cells, mammary epithelial stem cells, bane marrow-derived stem cells, skeletal muscle stem cells, bone marrow mesenchymal stem cells, $CD34^+$ haematopoietic stem cells and mesenchymal stem cells.

30. The method of claim 25, wherein said BMP4 is derived from a species homologous to said stem cells or said EPL cells.

31. The method of claim 25, wherein said BMP4 is derived from a species heterologous to said stem cells or said EPL cells.

32. The method of claim 25, wherein said stem cell or said EPL cell is isolated from an animal selected from the group consisting of primates, livestock animals, laboratory test animals, companion animals and avian species.

33. The method of claim 32, wherein said stem cell or EPL cell is isolated from a mammal.

34. The method of claim 33, wherein said stem cell or EPL is isolated from a human.

35. A composition comprising a modulator of mesodermal cell generation from EPL or other stem cells or maintaining or expanding mesodermal cells said composition further comprising one or more pharmaceutically acceptable carriers and/or diluents.